

Remarks

Reconsideration of this Application is respectfully requested.

Status of the Claims and Application

Upon entry of the foregoing amendments, claims 1-19, 27, and 35-44 are pending in the application, with claims 1, 9, 10, 11, 35, 36, 41, 42, 43, and 44 being the independent claims. Claims 20-26 and 28-34 previously were cancelled. Claims 9, 10, 19, 27, and 35 previously were withdrawn from consideration in the present application pursuant to a restriction/election of species requirement. Claims 1, 11, 36, 41, 43, and 44 are amended herein.

Summary of the Office Action

In the Office Action, claims 1-8, 11-18, and 36-41 were rejected under 35 U.S.C. § 101, as allegedly being directed to non-statutory subject matter, and claims 1-8, 11-18, and 36-44 variously were rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over U.S. Patent No. 6,049,777 (Sheena) in view of "Official Notice," and/or further in view of J. Schwinger, "The Geometry of Quantum States", Proceedings of the National Academy of Sciences of the United States of America, February 15, 1960 ("the Schwinger publication").

Reconsideration and withdrawal of the rejections respectfully are requested in view of the above amendments and the following remarks.

Rejection under 35 U.S.C. § 101

The rejection of claims 1-8, 11-18, and 36-41 under 35 U.S.C. § 101, as allegedly being directed to non-statutory subject matter, respectfully is traversed.

In the Office Action, claims 1-8, 11-18, and 36-41 are alleged to be directed to non-statutory subject matter because they recite method steps that "are not tied to another statutory class and can be performed without the use of a particular apparatus." (*see* page 7 of the Office Action). Without conceding the propriety of the rejection or the Examiner's characterization of the claims, and solely to advance prosecution of the application to issue, independent claims 1, 11, 36, and 41 have been further amended herein to recite more particularly reference to particular apparatus, as suggested by the Examiner. Support for these amendments may be found in the original application, e.g., in FIGs. 4 and 5, and at page 21, line 20 through page 24, line 12. No new matter has been added.

For at least the above reasons, Applicants submit claims 1, 11, 36, and 41 recite statutory subject matter.

Claims 2-8, 12-18, and 37-40 depend from claims 1, 11, and 36, respectively, and recite statutory subject matter for at least the same reasons.

Reconsideration and withdrawal of the rejection respectfully are requested.

Rejections under 35 U.S.C. § 103

The rejection of claims 1-7, 11-17, and 36-44 under 35 U.S.C. § 103(a), as allegedly being unpatentable over the Sheena '777 patent in view of "Official Notice," and the rejection of claims 8 and 18 under 35 U.S.C. § 103(a), as allegedly being unpatentable over the Sheena '777 patent and "Official Notice" further in view of the Schwinger publication, respectfully are traversed. Nevertheless, without conceding the propriety of the rejection, independent claims 1, 11, 36, and 41-44 have been amended with particular attention to the Examiner's comments. In particular, independent claims

1, 11, 36, and 41-44 have been amended to delete the term "binary" in certain instances in favor of the term "unary," to provide consistency and thereby avoid any possible ambiguity in the claim language. No new matter has been added, and Applicants submit that these amendments do not narrow the scope of the claims, because the feature of unary ratings data as recited in the claims is defined and explained in the application, as discussed in greater detail below.

In the Office Action, the Examiner asserts that the claimed invention merely is a predictable combination of what is known in the art. Specifically, the Examiner states:

It is the Examiner's position that the claimed invention is nothing more than a predictable combination of what is known in the art regarding using user's ratings of items, where those ratings are embodied in a matrix that indicates whether something has been rated as well as another matrix indicating what the variable ratings are.

(See page 6).

Applicants respectfully disagree.

Summary of Argument

Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made. 35 U.S.C. § 103. Specifically, Applicants submit that the Sheena '777 patent in view of "Official Notice" and/or further in view of the Schwinger publication, fails to disclose or suggest each element of the claims.

In particular, Applicants submit: (1) that each of independent claims 1, 11, 36, and 41-44 recites a combination of structure or processes including a feature of a *unary ratings matrix* or *unary array of ratings entries*, (2) that the claims do not merely include "descriptive material," but rather recite combinations of particular structure and

processes that functionally utilize particular data structures having particular relational characteristics, and thereby recite patent-eligible subject matter, (3) that the Sheena '777 patent fails to teach or suggest at least the features of a *unary ratings matrix* or *unary array of ratings entries*, and therefore further fails to teach or suggest the claimed combination of structure and processes functionally utilizing such unary ratings data structures (4) that the stated/alleged "Official Notice" does not remedy this deficiency, and (5) that the Schwinger publication does not remedy this deficiency.

More particularly with respect to item (3), Applicants submit that the Sheena '777 patent fails to teach or suggest the claimed features of a unary ratings matrix or unary array of ratings entries because (i) the Sheena '777 patent expressly teaches the use of subjective ratings selected based on a scale or range of values, not a unary ratings value; (ii) the Sheena '777 patent only teaches the use of Boolean values ("1" or "0") in connection with a calculation of a similarity factor D_{xy} between two users "x" and "y," and that such calculation uses both the Boolean values and the subjective ratings values in combination, whereby the Boolean values do *not* represent ratings values; (iii) the Sheena '777 patent does not teach storing the Boolean values in a ratings data structure either with or without the subjective ratings values (e.g., the disclosed "profile matrix"), further evincing that the Boolean values are not ratings values; (iv) the Sheena '777 patent teaches that the Boolean value "1" expressly and necessarily indicates in a computation that an item has been rated by a user, and therefore can *not* be particularly used to indicate a "positive" or "favorable" rating in a unary ratings matrix, as disclosed in the present application; and (v) in light of the above, the Sheena '777 patent teaches away from using a unary ratings matrix or unary array of ratings entries.

Independent Claims 1, 11, 36, and 41-44

Independent claims 1, 11, 36, and 41-44 variously relate to a method, apparatus or computer-readable medium and recite a combination of structure and process features functionally utilizing *a unary ratings matrix* or *a unary array of ratings entries*.

In one aspect, for example, **claim 1** recites a method comprising, *inter alia*:

generating, in memory, a sparse unary ratings matrix from a user's selected preferences, wherein said user's selected preferences are represented as unary data entries in said sparse unary ratings matrix, wherein each unary data entry has a value of either zero or one;

In another aspect, independent **claim 11** similarly recites a method comprising, *inter alia*:

generating, in memory, a sparse unary ratings matrix including ratings data represented as unary data entries, wherein each unary data entry has a value of either zero or one;

In another aspect, independent **claim 36** similarly recites a method comprising, *inter alia*:

receiving at a first recommendation system, including a data processing device, a runtime recommendation model from a second recommendation system, wherein the runtime model is formed from a plurality of data structures representing a unary array of ratings entries that can be arithmetically manipulated, wherein each unary data entry has a value of either zero or one, and wherein a majority of the entries in the array are zero;

In another aspect, independent **claim 41** recites a method comprising, *inter alia*:

retrieving at a first recommendation system, including a data processing device, a unary array of ratings entries that can be arithmetically manipulated, wherein data in the unary array of ratings entries is unary data, wherein each unary data entry has a value of either zero or one, and wherein a majority of the entries in the array are zero;

In another aspect, independent **claim 42** recites a data processing device comprising, *inter alia*:

a processor configured to generate in memory a sparse unary ratings matrix from a user's selected preferences, wherein said user's selected preferences are represented as unary data entries in said sparse unary ratings matrix, wherein each unary data entry has a value of either zero or one;

In another aspect, independent **claim 43** recites a data processing device comprising, *inter alia*:

means for generating in memory a sparse unary ratings matrix from a user's selected preferences, wherein said user's selected preferences are represented as unary data entries in said sparse unary ratings matrix, wherein each unary data entry has a value of either zero or one, and wherein a majority of the entries in said sparse unary ratings matrix are zero;

In another aspect, independent **claim 44** recites a computer-readable storage medium including computer-executable instructions for performing a method comprising, *inter alia*:

generating in memory a sparse unary ratings matrix from a user's selected preferences, wherein said user's selected preferences are represented as unary data entries in said sparse unary ratings matrix, wherein each unary data entry has a value of either zero or one;

In each aspect presented above (claims 1, 11, 36, and 41-44), the claim recites particular structure or processes functionally utilizing a ***unary ratings matrix*** or ***unary array of ratings entries*** in which *each ratings data entry* is a unary rating (either (only) "0" or "1").

The claimed features are *not* merely "Descriptive Material"

The claimed combination of features including a *unary ratings matrix* or *unary array of ratings entries* are not merely "*descriptive material*." The recited combinations

of structures and processes including such unary ratings data structures determine a functional interrelationship in the operation of the claimed subject matter (apparatus and method) and thereby distinguish the claimed subject matter over the cited references and Official Notice.

Applicants' specification defines and explains the above-discussed terms recited in the claims. In particular, the specification defines and explains the term *ratings matrix* as follows:

As used herein, a ratings matrix is a collection of numerical values indicating a relationship between a plurality of clients and a plurality of items. In general, and as indicated earlier, one may denote this as:

$$\mathbf{R} = \mathbf{R}_{u,i} = \{ 1 : \text{if client } u \text{ votes favorably for item } i / 0 : \text{otherwise} \}$$

Where $u \in U$, the set of all clients, and $i \in I$, the set of all items. One skilled in the art should appreciate that "votes favorably" as use above may correspond to a variety of acts. For example, a favorable vote may correspond to client u purchasing item i , or it may correspond to client u literally expressing a favorable interest in item i . Again, item i itself is not limited to goods but may also correspond to services.

See page 9, line 10 to page 10, line 1 (emphasis in original modified herein).

The specification further defines and explains the term *unary data* as follows:

As used herein, unary data indicates a ratings data in which there are only two types of information: *positive* and *no information*. Such data sources are usually encoded with rating values of either zero or one. It is customary to let zero express *no information* since such use produces a sparse data set.

See page 12, emphasis in original.

"In general, the collection of methods covered by the *M*-model approach maps a row of *M* to a vector using a function of $\text{Index}_k(\mathbf{M}_{i,*})$ and some statistics of *M*. *This is usually done to scale the ranking induced by the co-rate matrix.* This will be discussed in more detail later, but *the most basic of operations is to set all the non-zero co-rates to 1. As used herein, this operation is denoted by Unary ..."*

See page 13, lines 16-20 (emphasis added by italics).

In each aspect presented above (independent claims 1, 11, 36, and 41-44), the claim recites a combination of structure or process features including a *unary ratings data structure*, i.e., a *unary ratings matrix* or *unary array of ratings entries* in which each *unary ratings* entry is either (only) "0" or "1". Importantly, as noted in the portion cited above, *as used in the present application the term unary data indicates ratings data*.

As explained in greater detail in the present application, a recommendation system and method utilizing such a unary ratings matrix or unary array of ratings entries (unary ratings data structures), wherein each ratings entry is unary (not a subjective rating from a scale or range of ratings values), may provide a number of advantages over a recommendation system and process using a ratings data structure that is not unary in nature. For example, as taught in the specification, such unary ratings data structures may be efficiently populated as a direct result of binary decision trees from which the unary ratings data structures are built. Also as taught in the present application, in view of the volume of ratings data collected by clients engaged in E-commerce outpacing conventionally applied computational ability to rapidly process preferences and generate accurate recommendations (*see* page 4, lines 1 to 9), it may be advantageous to use such unary ratings data structures in order to allow rapid processing of such large ratings matrices (*see* page 18, lines 3-13, page 42, lines 10-13, and page 60, line 20 to page 61, line 4). Those skilled in the art would appreciate that this teaching of the present application, using the claimed unary ratings data structures, enables formation of runtime recommendation models on data processing devices that have inherently constrained resources, such as small personal digital assistants (PDAs) or other wireless devices,

such as mobile phones (*see* page 47, lines 4-18, page 57, lines 16-19, and page 62, lines 10-20). Further, as taught in the present application, in one aspect the use of such unary ratings data structures provides an additional advantage in the preservation of data privacy, as originally-entered ratings data that is *not* unary in nature cannot be reconstructed from a unary ratings matrix or unary array of ratings entries containing unary ratings values of either (only) "0" or "1" (*see* page 4, lines 10 to 13 and page 52, line 15 to page 53, line 6). In at least these aspects, the recommendation system and method disclosed in the specification and recited in the claims, utilizing a unary ratings data structure, is substantially different in function, way and result to known systems and methods.

Applicants submit that the various claimed combination of system and process features including a *unary ratings matrix* or *unary array of ratings entries* are not merely non-functional descriptive material, such as music, a literary work or a compilation or mere arrangement of data, as suggested by the Examiner. Rather, claims 1, 11, 36, and 41-44 recite a combination of features utilizing particular structure and process including functional descriptive material (data structures) that is recorded and/or processed, and thereby functionally interrelated with the particular structure and process such that the functional relationship may be realized. As such, Applicants submit that the claimed combination of features utilizing such unary ratings data structures patentably distinguish the claims of the present application over the cited references (and "Official Notice"). *See In re Gulack*, 703 F.2d 1381, 217 USPQ 401 (Fed. Cir. 1983); *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994); and MPEP 2106, as cited in the Office Action.

The cited references fail to teach or suggest the claimed features

Applicants submit that the cited Sheena '777 patent, "Official Notice," and Schwinger publication fail to disclose or suggest at least the above-described features of the claims. In particular, in contrast to the above-defined features of claims 1, 11, 36, and 41-44, the Sheena '777 patent teaches a system and method that constructs and uses a *profile data* structure that is *not a unary ratings matrix or unary array of ratings entries*, and that the cited Official Notice and Schwinger publication fail to remedy this deficiency.

The Sheena '777 patent fails to teach or suggest the claimed features

In the Office Action, the Examiner acknowledges that the Sheena '777 patent fails to teach a combination of features including a *unary ratings matrix or unary array of ratings entries*, as disclosed in the present application. However, the Examiner asserts that the subject matter recited in the claims is more broad than the disclosure, and asserts that the Sheena '777 patent *makes obvious such allegedly claimed subject matter*. Specifically, the Examiner states:

The fact that the applicant's invention, as disclosed in the specification, only uses a unary matrix (i.e., using ones or zeroes) as input when ***Sheena uses a combination of both numbers (to indicate relative degrees) and a unary matrix (to indicate whether a user has rated an item)*** does not prevent Sheena from making the claimed invention obvious.

See page 4 of the Office Action (emphasis added).

Applicants respectfully disagree with the Examiner's interpretation of the claims, the Examiner's characterization of the Sheena '777 patent disclosure as disclosing a unary ratings matrix, and the Examiner's conclusions relating to obviousness of the claimed subject matter over the cited references.

As discussed above, the present claims recite a *unary ratings matrix* or *unary array of ratings entries*, that is, the claims are directed to a matrix or array of unary ratings data entries, wherein each *unary ratings* entry is either (only) "0" or "1". As acknowledged by the Examiner above, and as further discussed below, the Sheena '777 patent teaches only the creation and use of a *profile* matrix including *subjective ratings*; the Sheena '777 patent separately teaches a *recommendation model* that utilizes a *similarity factor* that is *calculated using the subjective ratings of the profile matrix together with a Boolean quantity that has a value of "0" or "1" determined based on whether the user has rated the item or not*. Nowhere does the Sheena '777 patent disclose or suggest generating or using unary ratings data, wherein a rating of "1" means a "favorable" rating, and a "0" means "otherwise," as disclosed in the present application and recited in the present claims. Further, nowhere does the Sheena '777 patent teach storing the above-identified *Boolean quantity* values (0 or 1) in the profile matrix (*see, e.g., FIG. 2, the corresponding written disclosure, and further discussion below*), let alone generating a unary ratings matrix or unary array of ratings entries with such Boolean quantity values. Moreover, because each Boolean quantity of "0" or "1" used in the calculation of the similarity factor is not a *ratings* value, but rather only a value used to indicate *in the calculation of the similarity factor* whether or not a user has rated an item, even if the Sheena '777 patent did teach that such values were stored in a profile matrix (which Applicants do not concede), such entries would not constitute a *unary ratings matrix* or *unary array of ratings entries*, as disclosed in the present application and recited in the claims. This distinction is further revealed in the discussion of the Sheena '777 patent below.

The Sheena '777 patent relates to a computer-implemented collaborative filtering based method for recommending an item to a user, and discloses a collaborative filtering based recommendation system and method that generates and uses a profile data structure comprising "user profiles" and "user profile data" together with "item profiles" and "item profile data." The Sheena '777 patent teaches that *such profiles* may be stored as a data construct, such as a matrix or array. Specifically, the Sheena '777 patent states:

Each user profile associates items with the ratings given to those items by the user. Each user profile may also store information in addition to the user's rating. In one embodiment, ***the user profile stores information about the user, e.g., name, address, or age.*** In another embodiment, the user profile stores information about the rating, such as the time and date the user entered the rating for the item. ***User profiles can be any data construct that facilitates such associations, such as an array, although it is preferable to provide user profiles as sparse vectors of n-tuples, where each n-tuple contains at least an identifier representing the rated item and an identifier representing the rating that the user gave to the item, and may include any number of additional pieces of information regarding the item, the rating, or both.*** (See, e.g., column 3, lines 33-48).

The Sheena '777 patent thus teaches only a system and method that constructs and uses a *profile* data structure having entries including at least an item identifier *and* a user rating for the item.

The disclosed "item identifier" is thus clearly not a ratings data entry, as disclosed in the present application and recited in the claims.

With respect to the "user ratings," the Sheena '777 patent specifically teaches a system and method that uses *subjective ratings values* selected from a scale or range of values. Specifically, the Sheena '777 patent states:

Ratings for items which are received from users can be of any form that allows users to record subjective impressions of items based on their experience of the item. For example, items may be rated on an alphabetic scale ("A" to "F") or a numerical scale (1 to 10). In one embodiment, ratings are integers between 1 (lowest) and 7 (highest). ...

Ratings can be inferred by the system from the user's usage pattern. For example, the system may monitor *how long* the user views a particular Web page and store in that user's profile an indication that the user likes the page, assuming that *the longer the user views the page the more the user likes the page. ...*

(See column 4, lines 21-55; emphasis added).

That is, the Sheena '777 patent teaches a system in which stored and processed ratings are subjective values selected or inferred from a scale or range of values representing a subjective impression of the item.

In this regard, Applicants respectfully submit that the Examiner's characterization of column 8, lines 41-46 of Sheena is misplaced and, when viewed as a whole, in error. The Examiner correctly identifies this portion of the Sheena '777 patent as disclosing a feature of "using 1 to indicate that a user has rated the item and 0 to indicate that a user has not rated the item" (see page 9 of the Office Action). However, the portion cited by the Examiner does not relate to creating a profile data structure; rather, the cited portion relates only to the calculation of "similarity factors," which express the degree of correlation between two user's profiles for a particular set of items. In full context, this portion of the Sheena '777 patent describes various methods and corresponding equations for calculating such correlations, including the portion cited by the Examiner, as follows:

In the following description of methods, D_{xy} represents the similarity factor calculated between two users, x and y . **H_{ix} represents the rating given to item i by user x , i represents all items in the database, and c_{ix} is a Boolean quantity which is 1 if user x has rated item i and 0 if user x has not rated that item.**

(see column 8, lines 41-46 cited by Examiner; emphasis added).

As clearly stated in this portion of the Sheena '777 patent, H_{ix} represents the **rating** for an item, not c_{ix} ; nowhere does the Sheena '777 patent disclose or suggest that such rating H_{ix} is a *unary rating* of "0" or "1." Rather, quite the contrary, as discussed above, the Sheena '777 patent teaches that ratings are subjective values selected from a

scale or range of values. The Sheena '777 patent only teaches that a Boolean quantity c_{ix} , which has a value of "0" or "1" based on whether the user has given a rating for an item, is used in a particular equation, *together with the ratings value H_{ix} for the items*, to calculate a *similarity factor* between users' profiles for a particular set of items. For example, in one embodiment of a method for calculating the similarity factor, the Sheena '777 patent teaches the equation:

$$D_{xy} = \frac{\sum_{i \in I} c_{ix} c_{iy} (H_{ix} - H_{iy})^2}{\sum_{i \in I} c_{ix} c_{iy}}$$

(see column 8, lines 58-63).

The Sheena '777 patent discloses similar alternative embodiments for calculating similarity factor D_{xy} . See column 9, lines 1-55. In each of these embodiments, similarity factor D_{xy} is calculated using a Boolean quantity c_{ix} and a subjective *ratings* value H_{ix} for each item.

Further, nowhere does the Sheena '777 patent disclose or suggest that the Boolean quantity c_{ix} is stored in the profile matrix. The Examiner appears to assert at page 3 of the Office Action that the Sheena '777 patent teaches such feature at column 5, lines 2-17. Specifically, the Examiner asserts:

Examiner maintains that Sheena does disclose a user's selected preference are represented as binary data in said sparse unary ratings matrix in column 5, lines 2-17 (where item profiles are generated from user profiles, where the user profiles include either an item rating or no rating and where the rating data is stored in a matrix).

However, the cited portion of the Sheena '777 patent does not teach storing unary ratings or Boolean quantity values in a matrix. Rather, the cited portion merely teaches

that item profile data and user profile data may be stored in a matrix as respective n-tuples; specifically, the cited portion states:

... Alternatively, *item profiles may be generated from the user profiles stored in memory, by determining, for each user, if that user has rated the item and, if so, storing the rating and the user information in the item's profile.* Item profiles may be stored before user profiles are stored, after user profiles are stored or at the same time as user profiles. For example, *referring to FIG. 2, item profile data and user profile data may be stored as a matrix of values which provides user profile data when read "across," i.e. when rows of the matrix are accessed, and provides item profile data when read "down," i.e. when columns of the matrix are accessed.* A data construct of this sort could be provided by storing a set of user n-tuples and a set of item n-tuples. In order to read a row of the matrix a specific user n-tuple is accessed and in order to read a column of the matrix a specific item n-tuple is selected. (Column 5, lines 2-17; emphasis added).

As noted above, the Sheena '777 patent describes exemplary "user information," that is, "information about the user," as "e.g., name, address, or age." (*See also* citation to column 3, lines 34-47 presented above, emphasis added). Nowhere does the Sheena '777 patent teach or suggest that the "user information" includes a Boolean quantity value used for calculating a similarity factor D_{xy} .

Accordingly, nowhere does the Sheena '777 patent disclose or suggest at least the feature of a *unary ratings matrix*, or *unary array of ratings entries*, including *ratings* data represented as unary data entries, wherein each unary data entry has a value of either "0" or "1", as variously recited in independent claims 1, 11, 36, and 41-44.

Nor would it have been obvious to modify the teaching of the Sheena '777 patent to achieve at least these features of the claimed subject matter. As discussed above, the Sheena '777 patent teaches a method for determining a recommendation by calculating a similarity factor (D_{xy}) between two users based on profile data, wherein the *calculation* includes an indicator for the item (c_{ix}) *and* a subjective *rating* value for the item (H_{ix}). Referring for example to the above equation for similarity factor D_{xy} , modifying the

similarity factor equation to use only a Boolean quantity c_{ix} of 0 or 1 necessarily would require ignoring the user's subjective *rating* H_{ix} ; alternatively, modifying the similarity factor equation to use a *rating* value of "0" or "1" (that is, a non-subjective rating value), would make the Boolean value c_{ix} redundant, eliminate significant numbers of data points in the similarity factor summation (because positive H_{ix} and H_{iy} each necessarily would equal 1, whereby $H_{ix} - H_{iy}$ necessarily equals 0), and thereby would defeat the purpose of the subjective value *rating* H_{ix} .

In fact, the Sheena '777 patent expressly teaches away from using non-subjective ratings data H_{ix} , teaching that it would be unsatisfactory for Sheena's intended purpose. Specifically, the Sheena '777 patent states:

It is also desirable to reduce error in cases involving "extreme" ratings. That is, a method which predicts fairly well for item ratings representing ambivalence towards an item but which does poorly for item ratings representing extreme enjoyment or extreme disappointment with an item *is not useful for recommending items to users*.
(See column 8, lines 22-27).

The Sheena '777 patent thus fails to disclose or suggest at least the above-discussed combinations of features of the subject claims, including at least the feature of a *unary ratings matrix* or *unary array of ratings entries*, as disclosed in the present application and recited in Claims 1, 11, 36, and 41-44.

"Official Notice" fails to remedy deficiencies in the Sheena '777 patent

In the Office Action, the Examiner states:

Official Notice is taken that entering a 0 or 1 for selecting a choice is old and well known in the art and in combination with the teachings of Sheena would have been obvious to one of ordinary skill in the art at the time of the invention by producing a predictable result in combination with the teachings of Sheena regarding providing ratings (see column 4, line 24-25).

See Office Action at page 10.

Without conceding the propriety of the Examiner's characterization of what is old and well known in the art, Applicants submit that the stated/alleged Official Notice fails to remedy the deficiencies of the Sheena '777 patent or add anything to the Sheena '777 patent that would have made obvious the claimed invention.

Initially, Applicants submit that the Examiner has failed to make a proper showing that it would have been obvious to one of ordinary skill in the art at the time of the invention to have combined such knowledge ("entering a 0 or 1 for selecting a choice") with the teaching of the Sheena '777 patent to achieve the claimed method or process function, as recited in any one of claims 1, 11, 36, and 41-44. Applicants submit that merely "entering a "0" or "1" *for selecting a choice*" does not, *per se*, constitute "entering a *rating* of an item." Nowhere does either the asserted "Official Notice" or the Sheena '777 patent teach entering a "0" or "1" as a *rating* in a unary ratings matrix or unary array of ratings entries, wherein the rating is a unary "0" or "1", as disclosed in the present application and recited in the claims.

Further, neither the Sheena '777 patent nor such "knowledge" provides any motivation, reason or basis to combine such "knowledge" ("entering a "0" or "1" *for selecting a choice*") with the teaching of the Sheena '777 patent (entering a subjective rating for determining a recommendation) so as to *substitute* such "knowledge" for the described process of entering non-binary alphabetic ("A" to "F") or numerical (1-10) ratings scales in a profile matrix, as disclosed in the Sheena '777 patent. In particular, Applicants submit that generating a unary ratings matrix or unary array of ratings entries from a user's selected preferences, wherein said user's selected preferences are

represented as unary data entries in said unary ratings matrix or unary array of ratings entries, was not well known in the art at the time of the invention.

Further, the Examiner has made no showing that upon such combination the Sheena '777 patent would perform the same recited method steps. In fact, Applicants submit that, since the Sheena '777 patent does not generate a unary ratings matrix or unary array of ratings entries (0,1), as disclosed in the application and recited in the claims, each further process recited in the claims in the present application using as a basis such unary ratings matrix or unary array of ratings entries is substantially different and produces a substantially different result than the Sheena '777 patent process. That is, the Sheena '777 patent necessarily further fails to teach or suggest the feature of forming a plurality of data structures representing said unary ratings matrix (or said unary array of ratings entries) or the further feature of forming a runtime recommendation model from said plurality of data structures (representing said unary ratings matrix or unary array of ratings entries).

Finally, since the Sheena '777 patent teaches away from using non-subjective ratings, as discussed above, Applicants submit that it is improper to combine the Sheena '777 patent with the stated/alleged "Official Notice" to establish a *prima facie* case of obviousness. See *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 230 U.S.P.Q. 416 (Fed. Cir. 1986) (stating a reference should be considered as a whole, and portions arguing against or teaching away from the claims much be considered); *Gillette Co. v. S.C. Johnson & Son, Inc.*, 919 F.2d 720, 16 U.S.P.Q.2d 1933 (Fed. Cir. 1990) (stating the closest prior art should not be used because the closest prior art "would likely discourage the art worker from

attempting the substitution suggested by the [inventor/patentee].”); *In re Gurley*, 27 F.3d 551, 31 U.S.P.Q.3d 1130 (Fed. Cir. 1994) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, ... would be led in a direction divergent from the path that was taken by the applicant.”); *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997) (stating a prima facie case of obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention); M.P.E.P. §§ 2141.02 and 2145(X)(D)(2).

The Schwinger Publication also fails to remedy these deficiencies

The Schwinger publication is cited merely for its alleged disclosure of multiplying matrices by a mapping matrix in order to map the matrices to that matrix. Without conceding the propriety of the Examiner's characterization of the Schwinger publication, Applicants submit that the Schwinger publication fails to disclose or suggest at least the above-discussed features of a unary ratings matrix or unary array of ratings entries. Nor is the Schwinger publication understood to add anything to the Sheena '777 patent and the stated/alleged Official Notice that would have made obvious the claimed invention.

Further, as discussed above, as the Sheena '777 patent teaches away from claimed features, Applicants submit that there is no support or basis for combining the Sheena '777 patent with the Schwinger publication to achieve the claimed invention.

Summary

For at least these reasons, Applicants submit that independent claims 1, 11, 36, and 41-44 are allowable over the Sheena '777 patent, the alleged "Official Notice" and the Schwinger publication.

Claims 2-7, 12-17, and 37-40 depend from claims 1, 11, and 36, respectively, and are believed allowable for the same reasons. See, *In Re Fine*, 837 F.2d 1071 (Fed. Cir. 1988), and M.P.E.P. § 2143.03. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Entry of Amendment Under 37 C.F.R § 1.116

Applicants request that the present Amendment and Reply be entered and considered under 37 C.F.R. § 1.116. Applicants submit that the present amendments merely are formal or minor in nature, reduce the number of issues, and place the claims and application in better form for appeal. Applicants submit that the present amendments were made in response to the Examiner's comments in the Office Action, and were not previously made because Applicants believe the prior claims are allowable.

Conclusion

Applicants believe that the present Amendment is responsive to each of the points raised by the Examiner in the Office Action, and submit that the application is in condition for allowance. Favorable consideration of the claims and passage to issue of the application at the Examiner's earliest convenience earnestly are solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Respectfully submitted,

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